ASSIGNMENT 8

Textbook Assignment: "Water Treatment," chapter 7, pages 7-1 through 7-25.

8-1. The hydrologic (water) cycle is the process of circulation of water from the

1. oceans, to the atmosphere, to the earth, and beneath the earth
2. oceans, to the earth, and beneath the earth, and to the atmosphere
3. atmosphere, to the earth, and beneath the earth, and to the ocean
4. earth, and beneath the earth, to the ocean, and to the atmosphere

8-2. The flow of rainwater or melted snow into the soil is known by what term?

1. Evaporation
2. Infiltration
3. Dissipation
4. Condensation

8-3. What process in the hydrologic cycle forms clouds?

1. Evaporation
2. Infiltration
3. Condensation
4. Dissipation

8-4. In what way do plants influence the water cycle?

1. By evaporating water
2. By dissipating water
3. By condensing water
4. By transpiring water

8-5. The basic water supply is composed of what two classes?

1. Surface water and groundwater
2. Aquifers and wells
3. Moving water and still water
4. Artificial and natural

8-6. Water as rain, snow, sleet, fog, or dew falls upon the surface of the earth. What is the process called?

1. Condensation
2. Evaporation
3. Precipitation
4. Dissipation

8-7. The water precipitated from the atmosphere on the surface of the earth, absorbed by the soil, and collected below a certain level is known as

1. surface water
2. groundwater
3. precipitation
4. infiltration

8-8. Groundwater is NOT found under which of the following conditions?

1. A layer of decomposed rock is between the uppermost layer of soil and the virgin rock itself
2. The depth of the soil varies from a few inches to many feet
3. Part of the earth's crust is between solid rock and the surface of the earth
4. Virgin rock appears at the surface with no overlying decomposed rock or soil

8-9. Strata may be composed of hard materials, such as

1. silica
2. gypsum
3. clay
4. chalk

8-10. What term describes the capacity of the material in any stratum to transmit water under pressure?

1. Impermeability
2. Porosity
3. Permeability
4. Osmosis

8-11. What condition must be present for groundwater to constitute a water table?

1. Permeable
2. Porous
3. Percolated
4. Stabilized

8-12. Any stratum that bears groundwater is called a/an

1. well
2. aquifer
3. water table
4. interstice

8-13. Water beneath the surface occurs in a total of how many zones?

1. Five
2. Four
3. Three
4. Two

8-14. Perched water comes about because water is caught in a zone higher than the established water table. In what zone does this occur?

1. Soil moisture zone
2. Saturation zone
3. Percolation zone
4. Aeration zone

8-15. What conclusion can be drawn from the discussion in the textbook on the quality of water?

1. All water is impure to start with
2. Most water must be treated to make it safe for human consumption
3. Only industry does not have to treat water
4. Most water is pure to start with

8-16. Simply because water is clear may lead you to make what dangerous assumption?

1. It is potable
2. It is impure
3. It is contaminated
4. It is a carrier of disease

8-17. What are the two major classes of impurities in water?

1. Organic and inorganic
2. Odorless and smelly
3. Suspended and free
4. Dissolved and suspended

8-18. Algae is an example of what type of impurity?

1. Suspended
2. Dissolved
3. Inorganic
4. Decontaminated

8-19. What term is used to describe the time a waterborne disease requires to grow within a person's system?

1. Bacteriological period
2. Incubation period
3. Contamination period
4. Immunization period

8-20. An attack of paratyphoid immunes a person from what future disease?

1. Typhoid
2. Cholera
3. Paratyphoid
4. Amoebic dysentery

8-21. What type of waterborne disease requires a carrier to infect people?

1. Diarrhea
2. Cholera
3. Typhoid
4. Schistosomiasis

8-22. The formation of gelatinous particles in water by chemical action is known as

1. coagulation
2. flocculation
3. sedimentation
4. suspension

8-23. Clearing water of foreign suspended matter by a natural settling process is known as

1. filtration
2. coagulation
3. sedimentation
4. flocculation

8-24. What water purification process follows sedimentation to remove suspended matter?

1. Disinfection
2. Filtration
3. Coagulation
4. Flocculation

8-25. What is an effective filtration device used at overseas locations?

1. Diatomite filter
2. Filter alum
3. Floc chamber
4. Settling tank

8-26. Which of the following disinfectants is most often used because it is both economical and dependable used?

1. Bromine
2. Chlorine
3. Ozone
4. Potassium permanganate

8-27. What process comes first and last in making water safer for consumption?

1. Sedimentation
2. Coagulation
3. Chlorination
4. Filtration

8-28. The rate of disinfection of water drops drastically when the pH exceeds what level?

1. 7.5
2. 7.8
3. 8.0
4. 8.4

8-29. Each pound of liquid chlorine produces approximately how many cubic feet of chlorine gas?

1. 8
2. 7
3. 6
4. 5

8-30. What disinfectant is seldom used in water treatment because of rapid deterioration and low available chlorine yield?

1. HTH
2. Pittchlor
3. Lobax
4. Chlorinated lime

8-31. The amount of chlorine consumed in reacting with organic substances in water within a given time is called the

1. available chlorine
2. combined available chlorine
3. residual chlorine
4. chlorine demand

8-32. What minimum length of time must elapse from the time chlorine is introduced until the water can be used?

1. 10 minutes
2. 15 minutes
3. 30 minutes
4. 60 minutes

8-33. The amount of alkaline substances in a given sample of water when titrating downward to a pH of 4.2 with sulfuric acid defines the

1. pH of water
2. alkalinity of water
3. acidity of water
4. positive logarithm of hydrogen

8-34. What term describes the application of chlorine after filtration but before the water leaves the treatment plant?

1. Postchlorination
2. Rechlorination
3. Prechlorination
4. Residual chlorination

8-35. How much chlorine should be maintained in the chlorinator room?

1. Enough needed for anticipated emergencies
2. Enough for normal daily demands
3. Enough for a 48-hour supply
4. Enough for a 72-hour supply

8-36. What type of solution is used to detect a chlorine leak?

1. Ammonia
2. Soapy
3. Acetone
4. Peroxide

8-37. Chlorination equipment is classified by type, such as manual, semi-automatic, and fully automatic. This style of classification depends on what factor?

1. The rate of feed
2. The method of control
3. The installation procedures
4. The type of chlorine required

8-38. What do the three types of chlorinators have in common?

1. They are used in locations where water flows at a uniform rate
2. They start and stop when the water flow starts and stops
3. They meter chlorine through the pressure of a metering device
4. They require the chlorine dosage to be set manually

8-39. Chlorinators may be classified by what two types of feed?

1. Direct and indirect
2. Solution and direct
3. Direct and automatic
4. Solution and automatic

8-40. What type of chlorinator is used mainly as emergency equipment?

1. Direct feed
2. Indirect feed
3. Solution feed
4. Automatic feed

8-41. At which of the following points of an injector mechanism of the chlorinator is chlorine gas drawn into a jet stream of water?

1. Midpressure
2. High pressure
3. Low pressure
4. Each of the above

8-42. What is the expansion ratio of chlorine to gas?

1. 1:230
2. 1:320
3. 1:460
4. 1:640

8-43. What is the 24-hour capacity of the heavy-duty Midget Chlor-O-Feeder?

1. 95 gallons
2. 85 gallons
3. 75 gallons
4. 65 gallons

8-44. Empty chlorine cylinders should be stored in which of the following locations?

1. A room with a connecting door to the equipment room
2. The same room as the operating equipment
3. A separate room opening only from the outside
4. Any covered storage area

8-45. The clorination room in a water treatment plant is on sloping ground. Part of the floor level is aboveground and part is belowground. Which of the following features should the room contain?

1. Doors that open outward
2. A positive-pressure, blower-type exhaust fan
3. Two-way lighting switches on the outside and on the inside
4. Each of the above

8-46. For emergencies, what type of standby system should be used for discharge of chlorine cylinders?

1. Non-potable water
2. Alkali absorption
3. Chlorine containment
4. None of the above

8-47. When preparing and handling hypochlorite solutions, you should wear what type of safety clothing?

1. Goggles and plastic gloves
2. Rubber gloves and a protective apron
3. Protective apron and goggles
4. Plastic gloves and a protective apron

8-48. You are testing for leaks in ammonia gas piping with a bottle of diluted muriatic acid. If a leak is discovered, the fumes will be what color?

1. Yellow
2. Blue
3. Red
4. White

8-49. A Utilitiesman is NOT expected to perform which of the following tasks when conducting water treatment quality control?

1. Collect samples for chemical analysis
2. Collect samples for bacteriological examination
3. Run treatment control tests
4. Conduct a spectrographic analysis

8-50. For test results to show the actual condition of the water, what should be the condition of the samples?

1. Representative and uncontaminated
2. Abundant and realistic
3. Comprehensive and random
4. Typical and abundant

8-51. When you are collecting samples for chemical analysis and mineral content, the sample is usually what size?

1. 1 pint
2. 1 liter
3. 1 quart
4. 1 gallon

8-52. Before raw water from a lake or stream is taken for a testing sample, the discharge pump of a submerged water sampler should be operated until the discharge line is

1. flushed completely
2. free of water
3. free of trapped air
4. delivering water

8-53. A small amount (0.02 to 0.05 grams) of thiosulfate should be added to a water sample bottle to be used in a bacteriological examination of what type of water sample?

1. Water that comes from a lake
2. Water that contains harmful bacteria
3. Water that contains chlorine residual
4. Water that comes from a pipe tap

8-54. In collecting a water sample from a tap for bacteriological examination, you should take what action to prevent further contamination of the water?

1. Flush the tap
2. Heat the tap with an alcohol/gasoline torch
3. Remove the bottle stopper
4. Attach a rubber hose to the tap

8-55. To collect samples of water from lakes or ponds, you should be (a) what appropriate distance from the shore and select samples from (b) what minimum depth of water?

1. (a) 15 feet (b) 4 feet
2. (a) 25 feet (b) 5 feet
3. (a) 25 feet (b) 4 feet
4. (a) 15 feet (b) 5 feet

8-56. You are trying to determine how much of a substance is in a given solution by measuring the amount of another substance or reagent that must be added to the given solution to produce a given reaction. What is the name of this process?

1. Clarification
2. Titration
3. Colorimetric analysis
4. Colorimetric synthesis

8-57. What two tests are used to test water for chlorine residual?

1. Orthotolidine and orthomangesium
2. Orthomagnesium and orthocalcium
3. Orthotolidine and orthotolidine-arsenite
4. Orthotolidine-arsenite and orthomagnesium

8-58. What advantage does the OTA test have over the orthotolidine test?

1. It has no false color
2. It is less expensive
3. It is simpler
4. It has fewer procedural steps

8-59. When the chlorine residuals are measured during the OTA test, the sample should never exceed what temperature?

1. 20°C
2. 15°C
3. 10°C
4. 0°C

8-60. You have added a measured volume of water to the orthotolidine reagent in tube OT, mix the tube contents quickly, and 5 minutes later you have compared the results with the color standards. What value(s) have you obtained?

1. Free available chlorine
2. Total chlorine residual
3. Free available chlorine and interfering colors
4. Total chlorine residual and interfering colors

8-61. After the test procedure has been completed, the total chlorine residual may be calculated by subtracting what values?

1. (B-1) from (OT)
2. (B-2) from (OT)
3. (B-1) from (A)
4. (B-2) from (A)

8-62. What reading on a pH scale indicates a sample of water is neutral and that it exhibits no acidic or alkaline characteristics?

1. 5.2
2. 6.0
3. 7.0
4. 8.4

8-63. What pH indicator is used for testing water with a pH range of 6.0 to 7.6?

1. Cresol red
2. Thymol blue
3. Chlorophenol red
4. Bromothymol blue

8-64. In the salinity test, test solutions are measured with pipettes calibrated in

1. 0.10 mg
2. 0.10 ml
3. 0.01 mg
4. 0.01 ml

8-65. You are determining the alkalinity of a water sample by the methyl purple procedure. What color appears when the end point has been reached?

1. Green
2. Red
3. Gray
4. Purple

8-66. When determining the alkalinity of water with the methyl orange procedure, you should add what amount of acid?

1. 0.1 ml
2. 0.2 ml
3. 0.3 ml
4. 0.5 ml

8-67. In the titration method of determining water hardness, standard ETDA solution is added to the water sample until the end point is reached. The indicator should be what color?

1. Red in the presence of calcium and magnesium ions and blue in their absence
2. Blue in the presence of calcium and magnesium ions and red in their absence
3. Green in the presence of calcium and magnesium ions and pink in their absence
4. Pink in the presence of calcium and magnesium ions and green in their absence

8-68. To hold the pH value of a 50-ml water sample to the desired level of 10, you should add how many milliliters of hardness buffer?

1. 1.00
2. 2.00
3. 0.50
4. 4.00

8-69. In addition to the amount of chloride ions in the water, the chlorine test measures the amount of

1. magnesium
2. calcium
3. sodium chloride
4. calcium carbonate

8-70. What reagent is used to decolorize the sample in a chloride test?

1. Sulfuric acid
2. Aluminum hydroxide
3. Sodium carbonate
4. Silver nitrate

8-71. You are performing a sulfate test. After you add 1 ml of barium chloride solution to the filtrate, a clear solution appears after shaking the bottle. The result can be recorded in what manner?

1. Over 100 ppm
2. Under 100 ppm
3. Over 200 ppm
4. Between 100 and 300 ppm

8-72. When a water sample is filtered to remove turbidity before a color determination is made, what amount of the first portion of the filtered water should be discarded before a sample for the comparator test is selected?

1. 25 ml
2. 50 ml
3. 75 ml
4. 100 ml

8-73. When carrying out the threshold odor test, you must dilute how many glass-stoppered Erlenmeyer flasks to 250 ml of odor-free water?

1. One
2. Two
3. Three
4. Four

8-74. Ten gallons of odor-bearing water are diluted with 100 gallons of odor-free water. A barely perceptible odor remains. What threshold number should be assigned to the water?

1. 10
2. 100
3. 1,000
4. 10,000

8-75. In the threshold odor test, you heated the flask to 140°F on a hot plate. You then shook the odor-free flask, removed the stopper, and sniffed the vapors. Now, you should do the same with the flask containing how many ml of odor-bearing water?

1. 250
2. 63
3. 16
4. 4